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JONATHAN O. NOTTINGHAM, Lawrence, Kansas. *

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According to the present scheme of classification, **Carneocephala** stands as a connecting link between **Helochara** and **Draeculacephala,** having in general the size, length of vertex and pronotum of the former, but the reticulated elytral apex of the latter. The three genera may be separated as follows:

1. Apex of elytra not reticulated, male antennae enlarged and platelike on apical third ..... **Helochara.**
   Apex of elytra reticulated, male antennae normal ..... 2.

2 (1). Vertex flat or nearly so, with definite margins, longer than pronotum; front nearly straight in profile, marked with parallel lines on each side ..... **Draeculacephala.**
   Vertex convex, wth margins rounding, shorter than or about as long as pronotum; front convex and mottled or at most with interrupted lines. ..... **Carneocephala.**

The genus seems to be mostly tropical and subtropical though a few forms have been taken in the north temperate zone. It has never been recorded from any other than the western hemisphere.

The species of this genus seem to live mostly in

* Contribution from the Department of Entomology, University of Kansas.

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alkaline areas, but are not entirely confined there. In the United States, various species have been taken on the following plants: Bermuda grass, alfalfa, cotton, **Dondia, Salicornia, Atriplex,** and **Bates.**

The main characteristic upon which the species have been separated has been the structure of the head. The convexity of the disc and lateral margins of the vertex and pronotum, the position and size of the ocelli, the inflation of the front and the extent of the reticulation of the apex of the elytra, have all proved to be characters of utmost importance. In addition, most of the species have size, general color and color markings, constant enough in nature, so that they can be set out readily without making detailed measurements. The genitalia, while of secondary importance, possess differences which in certain instances have been of value. In the external genitalia of the female, the characters of use are the comparative lengths of the pygofer, the ultimate and penultimate segments of the abdomen, and the shape of the posterior margin of the last ventral segment. In the male genitalia, the shape of the valve, plates, length compared to the last abdominal segment and pygofer have been good characters. In the internal genitalia, the structure is complicated and generally found to be of little or no value. The author has, however, found that the dorsal and lateral views of the oedagus have been of some value in the final separation of species.

Through a loan from the Vienna museum of Signoret's type of **T. reticulata,** the author has concluded that the common **Carneocephala** in the Southern United States is Riley's **flaviceps** and not **reticulata.** Through a loan from the British museum of one of Fowler's types of **T. diducta,** the author has concluded that **diducta** is a synonym of **sagittifera** (Uhler) and not of **reticulata.**

Five species were previously known in this genus. In this paper, one species is restored, and three are described as new.

Description of Genus

Similar to **Draeculacephala** in general appearance and reticulate apical portion of elytra, but with front strongly inflated and rounding over to vertex. Color varying from light yellowish green through dark green to brownish black. Front usually lightly mottled with fulvous.

Head about as wide as pronotum, wider than long. Vertex convex, usually finely granulated, margins rounded, apex usually blunt but sometimes acute; frontal sutures distinct; ocelli on disc and about equidistant from posterior and lateral margins. Pronotum subhexagonal as in **Helochara,** more coarsely granulated than vertex, lateral margins diverging posteriorly, posterior margin emarginate. Elytra narrow, longer than abdomen in female, much longer in male.

Female last ventral segment about twice as long as preceding, posterior margin variable, but with a median lobe and sinuated to lateral angles. Pygofer sparsely spined, over twice as long as last ventral segment, never exceeded by ovipositor. Male last ventral segment longer than preceding, posterior margin slightly concave; valve subtriangular, margins straight or rounding; plates longer than last ventral segment and bearing slender finger-like processes which bend dorsad over pygofer tip.

Internal male genitalia similar to **Draeculacephala;** connective Y-shaped; lobe of oedagus when viewed dorsally, subovate and bearing one pair of short processes, connected at base to two pairs of processes, one short and truncate, the other long, slender and curved. In dorsal view, the processes are referred to as being dorsal, ventral or posterior. (See plate II, figure 8).

Key to Species

1. Vertex decidedly longer than pronotum ..... **floridana** (Ball).

   Vertex shorter or only about equalling pronotum....2.

2 (1). With many reticulations in apex of elytra ....3.

   With few reticulations in apex of elytra .....4.

3 (2). Vertex acute, concave between ocelli; dark green species ..... **fulgida** sp. n.

   Vertex blunt, concave between ocelli; lighter green species ..... **flaviceps** (Riley).

4 (2). Dark brown species, face dark, veins yellow .... **dyeri** (Gibson).

   Green or light brown species .....5.

5 (4). Larger species, females 6 mm., males 5 mm.; vertex very blunt in females ..... **gillettei** (Ball).

   Smaller species, females 5 mm., males 4 mm.; vertex more acute in females .....6.

6 (5). Vertex, pronotum and scutellum entirely unmarked ..... **nuda** sp. n.
Vertex, at least, always marked .....7.

7 (6). Light green species, vertex light tawny; pronotum and scutellum unmarked .....
triguttata sp. n.
Brownish-green species, vertex darker; pronotum and scutellum marked .....8.

8 (7). Vertex nearly uniformly dark fulvous, with few light markings, dark wedge-like spot extending to apex in male, and not entirely surrounded by light markings .....
reticulata (Signoret).
Vertex light fulvous, with more light markings, wedge-like spot set well back from apex, and usually surrounded by light markings .....
sagittifera (Uhler).

Carneocephala floridana (Ball).

Pls, I and II; figs. 9, a-c.

Draeculacephala floridana Ball, Proc. Ia. Acad. Sci., VIII, p. 72, pl. 6, 1901.

Carneocephala floridana Ball, Fla. Ent. XI, p. 39, 1927.

The largest species in the genus and with a very long and acute vertex. Length, female 8.1 mm.; male, 6.5—7 mm.

Head, including eyes, slightly wider than pronotum. Vertex, finely granulated, concave when viewed laterally, margins broadly rounding, apex very acute; one-sixth wider than long in female, one-fourth in male; nearly three times as long at middle as against the eyes; ocelli relatively small, slightly closer to posterior then to lateral margin in female.

Pronotum transversely granulated, distinctly shorter than vertex, posterior margin slightly emarginate. Elytra longer than abdomen, reticulations relatively few and extending cephalad of tip of clavus.

External genitalia: Female last ventral segment less than twice as long as preceding, posterior margin with produced lobe on median third and sinuated to lateral margins; pygofer nearly three times as long as last ventral segment, lateral margins concave preapically. Male last ventral segment longer than preceding;

valve with posterior margins rounded; plates with concave margins, failing to reach tip of pygofer and bearing finger-like processes.

Internal male genitalia: Lobe of oedagus broad and nearly evenly rounded, slightly emarginated at tip, apex long and slender in side view, and with single median large tooth-like process on inner margin; posterior processes heavy and with deep emargination at base.

Color: Vertex yellowish green, faintly mottled with fulvous. Apical spot pearly white, surrounded by fuscous band extending one-third the distance of the vertex posteriorly as a single fulvous line, then branching and diverging toward ocelli and terminating in the frontal sutures. Pronotum green on disc, light yellowish green on anterior margin. Scutellum .yellowish green Elytra green, margins and veins pale. Face pale with fulvous markings forming arcs ventrally and mottlings dorsally and with a median fulvous line extending irregularly from clypeus to apex; thorax yellowish green; abdomen yellow; legs pale, tarsi fulvous.

Distribution: This unique species has hitherto been recorded only from Florida and Georgia. The author has before him specimens from Florida and Brazoria, Cameron, and Aransas counties, Texas.

Dr. E. D. Ball records having taken both nymphs and adults of this species on a mixture of Sea Blite **(Salicornia herbacea)** and Salt Wort **(Bates maritima)** growing in profusion on the tide flats along the Atlantic Coast of Florida from Jacksonville to Miami.

Carneocephala fulgida sp. n.

Pl. I, fig. 6, a-c; Pl. II, fig. 6, a-c.

Allied to **flaviceps** (Riley) but with a more pointed vertex, and of a deeper and more shiny green color. Length, female 5.5—6 mm.; male 4.5—5 mm.

Head slightly wider than pronotum. Vertex rather flat except for raised areas near the ocelli, granulated; one-half wider than long, fully twice as long at middle as against the eyes, lateral margins slightly convex, apex relatively acute; ocelli smaller than in **flaviceps,** about twice as far from lateral as from posterior margin.

Pronotum coarsely granulated, about one-third longer than vertex in both sexes, posterior margin not

as deeply emarginate as in **flaviceps.**

Elytra distinctly longer than abdomen, with nervures distinct, apex reticulated with many broad veins which extend cephalad of tip of clavus.

External genitalia: Female last ventral segment twice as long as preceding, posterior margin with produced lobe on median third and distinctly sinuated to lateral angles; pygofer shorter than in **flaviceps** and slightly concave preapically. Male last ventral segment distinctly longer than preceding; valve with posterior margins nearly straight; plates with straight margins, reaching end of pygofer and bearing finger-like processes.

Internal male genitalia: Lobe of oedagus narrower than in **flaviceps,** posterior and ventral processes more slender.

Color: Vertex fulvous, darker in male, mottled with lighter markings as follows: spot at apex, bands along anterior margins, spots around ocelli with an arc connecting them, and a spot cephalad of the arc; posterior margin yellowish green. Pronotum yellowish green, darker on posterior third. Scutellum yellowish green, slightly darker apically. Elytra shining dark green, apices smoky; veins lighter green, hyaline apically in male. Face fulvous mottled with lighter spots forming indistinct arcs; thorax yellowish green; abdomen yellow with last ventral segment of female slightly fuscous apically. Legs pale, tarsi brownish.

Holotype, male, Lemon Cove, Calif., July 24, 1929, R. H. Beamer. **Allotype,** female, same data. **Paratypes,** 10 males and 21 females, same data; 8 males and 3 females, Winters, Calif., August 6, 1929, R. H. Beamer; 26 males and 22 females, Sacramento, Calif., August 7, 1929, L. D. Anderson; 4 males and 4 females, same data, R. H. Beamer; 4 females, Spreckels, Calif., May 14, 1929, G. E. Bensel; 13 females and 9 males, Calif., C. F. Baker.

The external genitalia and heads of the holotype and allotype are figured along with the internal genitalia of a paratype from the same locality.

The name **fulgida** is proposed for this species because of its shining appearance.

Some paratypes deposited in the United States National Museum; all other types deposited in the Snow Entomological Collection.

Carneophala flaviceps (Riley)

Pl. I, fig. 7, a-c; Pl. II, fig. 8, a-c.

Diedrocephala flaviceps Riley, Am. Ent., III, p. 78, 1880.

A rather large species with a blunt, fulvous vertex bearing very large ocelli. Length, female 5—6.3 mm.; male 4.5—5 mm.

Head as wide as pronotum, wider in female; including eyes, about two and one-half times as broad as long. Vertex convex on disc, finely granulated, margins very rounding; over twice as long at middle as against the eyes, lateral margins convex, apex broadly rounding, ocelli very large, nearer posterior than lateral margins.

Pronotum rather finely granulated, about one-third longer than vertex, posterior margin roundingly but not deeply emarginated.

Elytra longer than abdomen, nervures very distinct, apex reticulated with many broad veins which may extend cephalad of tip of clavus.

External genitalia: Female last ventral segment slightly over twice as long as preceding, posterior margin with broad slightly produced median lobe, only slightly sinuated to rounded lateral angles; pygofer with straight margins, about two and one-half times as long as last ventral segment. Male last ventral segment barely longer than preceding; valve with posterior margins rounding; plates broad with posterior margins nearly straight, not reaching end of pygofer but bearing finger-like processes which reach pygofer tip.

Internal male genitalia: Lobe of oedagus broad across base and tapering posteriorly; viewed laterally, with trace of protuberance on ventral margin and a single tooth-like process on inner margin.

Color: Vertex with general ground color fulvous, lighter posteriorly, marked with white as follows: large wedges bordering inner margins of ocelli, spot at apex, mottlings along lateral margins in female. Pronotum green on disc, anterior margin yellowish green. Scutellum yellowish green. Elytra usually dull grass green, though sometimes shiny, apices lighter, smoky in male, veins whitish, hyaline apically. Face pinkish to fulvous, irregularly mottled with light brown; thorax light yellow; abdomen yellow, lateral margins of venter of fe-

male usually reddish; tibiae and tarsi tinged with fulvous.

Distribution: This common species has hitherto been recorded from South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Virginia, Kentucky, Arizona, Texas, Nebraska, California, and Mexico. The author has studied a great number of specimens from all of the above mentioned states and in addition is adding the following: New Mexico, Arkansas, Oklahoma, Kansas, Tennessee, Missouri, and Wisconsin. It is not at all improbable that the records of **flaviceps** from Arizona, California, and Mexico are not for **flaviceps** but for one of the new species described in this paper.

Many of the records for this species state that it is destructive to wheat and oats, but since most of these records come from excessive abundance during autumn, it is probable that they are based on migrations from neighboring grasslands. Osborn records the finding of adults and nymphs on grassland adjacent to wheatfields at Raleigh, North Carolina; and on Bermuda grass at Columbia and Clemson College, South Carolina, and in Georgia, Mississippi, and Texas.

This species has commonly been called **reticulata,** practically all of the references to this species in the literature being under this name. In straightening out this complex, the author has been particularly fortunate in having the types of both **reticulata** and **flaviceps** before him at the same time. The types of **flaviceps** are: 1 female, 1875, South Carolina; 2 males and 7 females, injuring wheat and oats, February 9, 1876.

In Riley's description of this species, mention was made of the fact that this species was labeled **Tettigonia flavicephalum** in Fitch's collection but that it had never been described as such.

Riley's types are in the United States National Museum.

Carneocephala dyeri (Gibson)

Pl. 1, fig. 5, a-c; Pl. II, fig. 4, a-c.

Tettigonia dyeri Gibson, Proc. Biol. Soc. Wash., XXXII, p. 25, 1919.

A rather small species, nearly black, with the veins and tip of scutellum yellow. Length, female 4.5—5.2 mm.; male 4—4.2 mm.

Head about as wide as pronotum. Vertex slightly convex except for sunken areas laterad of ocelli, sloping abruptly at apex, finely granulated; including eyes, over twice as broad as long, three times as long at middle as against the eyes in female, twice as long in male; lateral margins convex, apex slightly obtuse; ocelli much larger than in **reticulata,** slightly closer to posterior than to lateral margin.

Pronotum distinctly raised in female, coarsely granulated, about one-fourth longer than vertex in both sexes, posterior margin deeply emarginate.

Elytra distinctly longer than abdomen with nervures distinct; reticulations relatively few and may extend cephalad of tip of clavus.

External genitalia: Female last ventral segment over twice as long as preceding, posterior margin with emarginated median lobe not much produced, but deeply sinuated to lateral angles; pygofer nearly three times as long as last ventral segment. Male last ventral segment longer and much wider than preceding; valve with posterior margins nearly straight; plates short and broad, not much longer than last ventral segment, barely reaching end of pygofer and bearing long finger-like processes which turn dorsad around end of pygofer.

Internal male genitalia: Lobe of oedagus distinctly widest across middle, sinuated to constricted base; in side view, with sharp tooth-like process basally, posterior processes very long.

Color: Vertex dark brownish, nearly concolorous, with light spots on inner margins of ocelli and a light spot at apex. Pronotum dark brownish with traces of vermiculate markings on anterior margin, median carina yellow. Scutellum dark brown with apex yellow, basal spots usually indistinct. Elytra dark brown to nearly black with veins yellow, hyaline apically. Face dark brownish black, clypeus lighter; thorax blackish, tinged with yellow. Abdomen varying from yellow to light brown. Legs pale, tarsi and spines brown.

Distribution: Hitherto recorded from Tegucigalpa, Honduras. The author has before him paratypes from the above locality, and a great number of specimens from Quirigua and Antiqua, Guatemala; and LeCeiba, Honduras. This material was loaned for study through the courtesy of the United States National Museum.

Carneocephala gillettei (Ball)

Pl. I, fig. 8, a-c; Pl. II, fig. 3, a-c.

Draeculacephala gillettei Ball, Proc. Ia. Acad. Sci., VIII, p. 72, 1901.

Carneocephala gillettei Ball, Fla. Ent., XI, p. 39, 1927.

A rather large, robust species; vertex blunt in female, about as long as pronotum. Length, female 5.8—6.1 mm.; male 4.8—5.25 mm,

Head as wide as pronotum. Vertex slightly convex except for sunken areas laterad of ocelli, coarsely granulated; including eyes, twice as broad as long in male, one-half wider than long in female, three times as long at middle as against the eyes; lateral margins much more convex in female than in male, apex distinctly blunt in female, relatively acute in male; ocelli very small, slightly closer to lateral than to posterior margin.

Pronotum coarsely granulated, slightly longer than vertex in male, posterior margin slightly angularly emarginate.

Elytra longer than abdomen, nervures distinct, reticulations few and seldom extending cephalad of tip of clavus.

External male genitalia: Female last ventral segment over twice as long as preceding, posterior margin with emarginated lobe on median third, deeply sinuated to produced lateral angles; pygofer over twice as long as last ventral segment, lateral margins slightly concave. Male last ventral segment longer than preceding; valve very small, posterior margins straight; plates short and broad, scarcely longer than last ventral segment, lateral margins straight, inner margins diverging abruptly at apex, bearing finger-like processes which do not reach end of pygofer.

Internal male genitalia: Lobe of oedagus widest at base, distinctly sinuated to deeply emarginated apex, long narrow constriction between base of lobe and posterior processes; in side view, slender at tip, enlarged medially, and with basal tooth lacking.

Color: Vertex pale yellow, finely irrorate with brown; a fuscous wedge, often indistinct in female, extending from apex to middle, a fuscous line extending from base of wedge to posterior margin and with black frontal sutures to ocelli. Pronotum yellowish green to ash gray, light yellow on anterior margin and with in-

distinct brown spots on anterior third parallel to anterior margin. Scutellum, yellowish green to cinereous, impressed line black, with four more or less distinct basal spots. Elytra green to cinereous, veins lighter. Face yellow irrorate with pale brown; thorax yellowish green; abdomen yellowish, tinted with red in male. Legs testaceous to cinereous, tinged with fulvous.

Distribution: Dr. E. D. Ball described this species from specimens from LaSalle and Ft. Collins, Colorado. The writer is adding Manzamba, Colorado.

Dr. E. D. Ball reports that this species has been taken only in a few isolated areas of Colorado and that species of **Salicornia** and **Dondia** may be the food plant.

In the study of this rare species, the author had the good fortune to be able to study three specimens of the type series, this material having been made available through the courtesy of Professors Gillette and McCampbell of the Colorado Agricultural College.

Carneocephala nuda sp. n.

Pl. I, fig. 3, a-c; Pl. II, fig. 2, a-c.

Allied to **fulgida** sp. n., but smaller, less robust, less shining, with shorter, blunter, and more inflated head, and with fewer reticulations in elytra. Length, female 4.5 mm.; male 4 mm.

Head slightly narrower than pronotum, including eyes twice as broad as long. Vertex slightly convex especially in male, hollowed out medially and laterad of ocelli, finely granulated; more than twice as long at middle as against the eyes; lateral margins convex and rounding as in **flaviceps;** apex broadly rounding; ocelli raised, of about the same size as in **fulgida;** slightly closer to posterior than to lateral margins.

Pronotum less coarsely granulated than in **fulgida;** one-third longer than vertex in both sexes, posterior margin strongly emarginate.

Elytra distinctly longer than abdomen, with nervures distinct; reticulations few with practically no complete cells cephalad of tip of clavus; apex broadly hyaline with fourth apical cell very wide.

External genitalia: Female last ventral segment twice as long as preceding, posterior margin with produced lobe on median third and sinuated to lateral angles, pygofer shorter than in **fulgida.** Male last ventral segment only slightly longer than preceding, valve with

posterior margins rounding; plates shorter than in **fulgida,** barely reaching end of pygofer and bearing finger-like processes.

Internal male genitalia: Lobe of oedagus wider at base and more tapered at tip than in **fulgida.**

Color: Vertex of female fulvous, male darker; white area around inner margin of ocelli and a light band around margin of vertex. Pronotum yellowish green, lighter on anterior margin and with a trace of a median yellow carina. Scutellum yellowish green sometimes with indistinct spots cephalad of transverse black suture. Elytra dark green; veins yellowish green, hyaline apically, slightly smoky in male. Face fulvous, mottled with white and sometimes with dark brownish indistinct arcs. Rest of underside pale yellow; legs tinged with brown.

Holotype, male, Pima Co. Ariz., July 27, 1927, P. A. Readio. **Allotype,** female, same data. **Paratypes,** 3 males and 4 females, same data; 4 males, Mescal, Ariz., July 28, 1927, R. H. Beamer; 2 males and 3 females, Santa Catalina Mts. Ariz., Altitude 3200 ft., April 25, 1926, A. A. Nichol; 1 male, Maricopa Co., Ariz., July 1, R. H. Beamer; 1 female, same data, P. W. Oman; 1 male and 1 female, Cochise Co., Ariz., July 29, 1927, R. H. Beamer; 1 female, Tuscon, Ariz., July 7, 1924, A. A. Nichol; 6 males and 8 females, Tlahuaillo, Durango, Mexico, 10-1000 ft. altitude, airplane collecting, September 3-12, 1929, P. A. Glick; 6 males and 4 females, Esperango, Mexico, November 8, 1917, taken on grass, E. A. McGregor; 4 males and 2 females, Presido River, Sinalos, Mexico, September 26, 1918, J. Aug. Kusche.

The external genitalia and heads of the holotype, allotype, and a paratype are figured along with the internal genitalia of a paratype from Mescal, Ariz.

The name **nuda** is proposed for this species because of the lack of markings on the vertex.

Some paratypes deposited in the United States National Museum; all other types deposited in Snow Entomological Collection.

Carneocephala triguttata sp. n.

Pl. I, fig. 1, a-c; Pl. II, fig. 5 a-c.

Allied to **gillettei** (Ball) but smaller and less robust with head shorter and without traces of dark markings

on pronotum or scutellum. Length, female 5.4mm.; male 4.2 mm.

Head including eyes slightly more than twice as broad as long, slightly wider than pronotum. Vertex nearly flat in male, concave in female before ocelli, finely granulated; more than twice as long at middle as against the eyes; lateral margins convex. Ocelli raised, larger than in **gillettei,** much smaller than in **flaviceps;** nearly equidistant from posterior and lateral margins.

Pronotum coarsely granulated; not more than one-fourth longer than vertex; posterior margin more deeply emarginate than in male **gillettei.** Elytra distinctly longer than abdomen; nervures distinct; reticulations relatively few in number and not extending cephalad of tip of clavus.

External genitalia: Last ventral segment of female over twice as long as preceding; posterior margin with produced lobe on median third, sinuated to lateral angles. Pygofer shorter than in **gillettei;** nearly three times as long as last ventral segment. Last ventral segment of male distinctly longer than preceding; valve with rounded posterior margins; plates with concave margins, apices not reaching end of pygofer but bearing finger-like processes which extend to pygofer tip.

Internal male genitalia: Lobe of oedagus quite elongate, with margins slightly sinuate; in side view, thick, tip acutely pointed; posterior processes slender; ventral processes very slender and evenly tapered.

Color: General ground color of vertex tawny, lighter in female. In well marked specimen light areas between ocelli and apex tend to form capital letter A with inclosed area dark. Apex light, surrounded by irregular black line; ocelli blackish, together with postapical spot causing vertex to appear to be three spotted. Pronotum yellowish green, of about same shade as anterior margin of pronotum. Elytra green as in **gillettei,** veins lighter; apical cells hyaline and smoky in male. Face light, irregularly marked with fulvous, fulvous marks sometimes in irregular lines. Underside of thorax yellowish green, abdomen yellow; legs and tarsi pale yellowish to brownish.

Holotype, male, Coachella, Calif., July 15, 1930, D. G. Hall. **Allotype,** female, Holtville, Calif., July 2, 1929. R. H. Beamer. **Paratypes,** 1 male, same data as allo-

type; 1 male, Indio, Calif., July 24, 1929, R. H. Beamer; 12 males and 15 females, same data as holotype; 1 female, Calexico, Calif., August 20, 1931, H. W. Capps; 6 males, Palm Springs, Calif., T. F. Winburn and R. H. Painter; 7 males and 6 females, Laws, Calif., Owne's Ranch, November 16, 1914, A. Wetmore; 9 males and 4 females, El Centro, Calif., E. A. McGregor; 1 male, Westmoreland, Calif., E. A. McGregor.

The specimens collected by E. A. McGregor at El-Centro, Calif., taken on alfalfa and cotton, were referred to as **sagittifera** by Olsen (Bull. Brooklyn Ent. Soc., XIII, No. 5, 1918).

The heads and internal genitalia of the holotype and allotype are figured along with the internal genitalia of a male paratype from Coachella, Calif.

Some paratypes deposited at the Kansas State College and in the United States National Museum; all other types deposited in the Snow Entomological Collection.

Carneocephala reticulata (Signoret)

Pl. I, fig. 4, a-c; Pl. II, fig. 1, a-c.

Tettigonia reticulata Signoret, Ann. Soc. Ent. Fr., ser, 3, II, p. 22, pl. 2, fig. 10, 1854.

A small robust species with fulvous vertex and with pronotum and scutellum at most but faintly marked. Length, female 4.2 mm.; males 3.4—3.5 mm,

Head about as wide as pronotum. Vertex with sunken areas laterad of ocelli, posterior margin slightly raised in female, finely granulated; including eyes over twice as wide as long, two and one-half times as long at middle as against the eyes in female, less than twice as long in male, lateral margins convex, apex very blunt; ocelli small, slightly closer to posterior than to lateral margin.

Pronotum rather coarsely granulated, less than one-third longer than vertex, posterior margin deeply emarginate.

Elytra longer than abdomen with nervures distinct, apex with relatively few reticulations which seldom extend cephalad of tip of clavus.

External genitalia: Female last ventral segment much over twice as long as preceding, posterior margin with produced median lobe which is deeply sinuated to rounded lateral angles; pygofer over twice as long as

last ventral segment. Male last ventral segment slightly longer than preceding, valve with rounded posterior margins; plates with straight margins, only slightly longer than last ventral segment, failing to reach end of pygofer, but bearing finger-like processes which bend dorsad reaching pygofer tip.

Internal male genitalia: Lobe of oedagus subovate, evenly rounded, constriction at base rather long, in side view thick with short, sharp basal tooth.

Color: Vertex with general ground color fulvous, fuscous wedge cephalad of middle extending to white spot at apex, large white areas on inner margins of ocelli, sometimes additional white marks around dark wedge and on lateral margins of vertex. Pronotum yellowish green with four rather indistinct brown spots on cephalic third. Elytra sage green, smoky apically; veins yellowish green, hyaline apically. Face light fulvous, rather mottled and with irregular arcs formed by darker brown; thorax yellowish green; abdomen yellow. Legs pale, tarsi and spines brown.

Distribution: Hitherto reported from Cuba. The author is adding the following localities: Isle of Pines; Jamaica; Haiti; Dominican Republic, and Canal Zone. The material from the last four localities is not as typical as are the Cuban and Isle of Pines specimens.

It will be seen that this species, as now understood, had not been recorded from the United States.

Through the courtesy of the Vienna museum, the author has been able to study Signoret's type of this species from Cuba. The type, which is rather mutilated, is closest to **sagittifera** (Uhler), but very distinct from **flaviceps** (Riley) and **dyeri** (Gibson).

Carneocephala sagittifera (Uhler)

Pl. I, fig. 2, a-c; Pl. II, fig. 7, a.

Tettigonia (Diedrocephala) sagittifera Uhler, Proc. Zool. Soc. Lond., p. 76, July 15, 1895,

Draeculacephala sagittifera Olsen, Bull. Brook. Ento. Soc., XIII, No. 5, December, 1918.

Carneocephala sagittifera Ball, Fla. Ent., XI, p. 40, 1927.

Tettigonia diducta Fowler, Biol. Centr. Am., Homop., II, p. 274, pl. 18, fig. 17, 1900.

A small brownish-green species with black arrow

on vertex; pronotum with brownish vermiculations and scutellum with spots. Length, female 4.5 mm.; male 4 mm.

Head including eyes as wide as pronotum, wider in female, twice as wide as long. Vertex slightly depressed before ocelli; finely granulated; more than twice as long at middle as against the eyes, lateral margins slightly convex, apex roundingly acute; ocelli relatively small, slightly closer to posterior than to lateral margin.

Pronotum one-third longer than vertex in male; less than one-fourth longer than vertex in female; relatively finely granulated and rather deeply emarginate on posterior margin.

Elytra longer than abdomen with nervures narrow but distinct on basal three-fourths, becoming rather indistinct in reticulated area; reticulations much less numerous than in **flaviceps** and not extending cephalad of tip of clavus.

External genitalia: Female last ventral segment over twice as long as preceding, posterior margin with produced lobe on median third and not deeply sinuated to lateral angles; pygofer twice as long as last ventral segment. Male last ventral segment much longer than preceding; valve with posterior margins rounding, apex slightly produced; plates with lateral margins distinctly concave, slender at apices, reaching end of pygofer and bearing finger-like processes.

Internal male genitalia: Lobe of oedagus of nearly uniform width, apex bluntly rounded, not showing basal tooth in lateral view; ventral processes heavy and evenly tapered.

Color: Vertex fulvous, darker in male with a median fuscous line extending caudad from a dark post-apical arrow to posterior margin, and marked with paler marks as follows: spot at apex, spots around ocelli, lateral margins, lines or spots around post-apical arrow, and two to four spots on posterior margin. Pronotum dark yellowish green, nearly yellow anteriorly with fuscous vermiculations on anterior third. Scutellum light yellowish green with two or three dark spots cephalad of impressed line, and a dark wedge in each basal angle. Elytra brownish green, nervures yellowish green, hyaline posteriorly, apical cells slightly smoky in

male. Face fulvous mottled with white; thorax light yellowish green; abdomen yellow. Legs semihyaline tinged with fulvous.

Distribution: This species has hitherto been recorded from Texas and California by Olsen. Ball adds West Indies and Utah with the note that at St. George, Utah, he took it on Dondia and Atriplex. The record from California is a record for **triguttata** sp. n., and the Utah record probably refers to one of the new species herein described. The author has a great deal of material before him from the following localities: Cameron, Colorado, Caddo, Brazoria, Brooks, Hidalgo, Jim Wells, Bee, Starr, Orange, and Victoria counties, Texas; Calcasieu and Orleans counties, Louisiana; Virginia; in the West Indies, Virgin Islands, Grenada, Tobago, Trinidad, Porto Rico, and Dominican Republic; in Mexico, Vera Cruz and Guerrero.

Uhler's description is from specimens from Vincent, West Indies.

In the study of this species, the author has been greatly aided by the use of specimens from the Virgin Islands, compared with Uhler's types in the United States National Museum by P. W. Oman.

Through the courtesy of W. E. China of the British museum, the author has been able to examine one of Fowler's types of **Tettigonia diducta** from Orizaba, Mexico. **T. diducta** is a synonym of **sagittifera** and not of **reticulata** as has commonly been thought.

(On Plate I, figs. 2 & 2c refer to the male; figs. 2a & 2b to the female.)

Explanation of Plates

Plate I. Single numbers refer to dorsal view of head and pronotum of female.
Letter "a" is added to lateral view of female.
Letter "b" is added to dorsal view of male.
Letter "c" is added to lateral view of male.

Plate II. Single numbers refer to lateral view of apical portion of oedagus.
Letter "a" is added to dorsal view of same.
Letter "b" is added to external male genitalia.
Letter "c" is added to external female genitalia.

PLATE I

The Genus **Carneocephala** Jonathan O. Nottingham

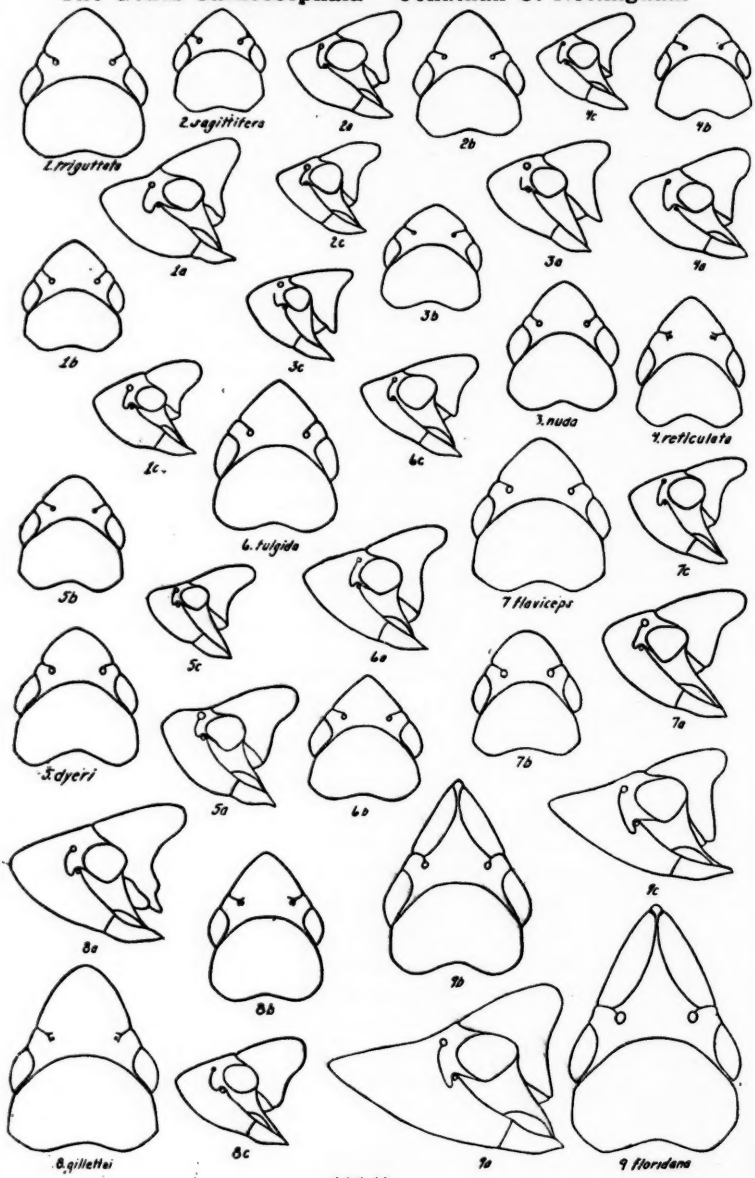
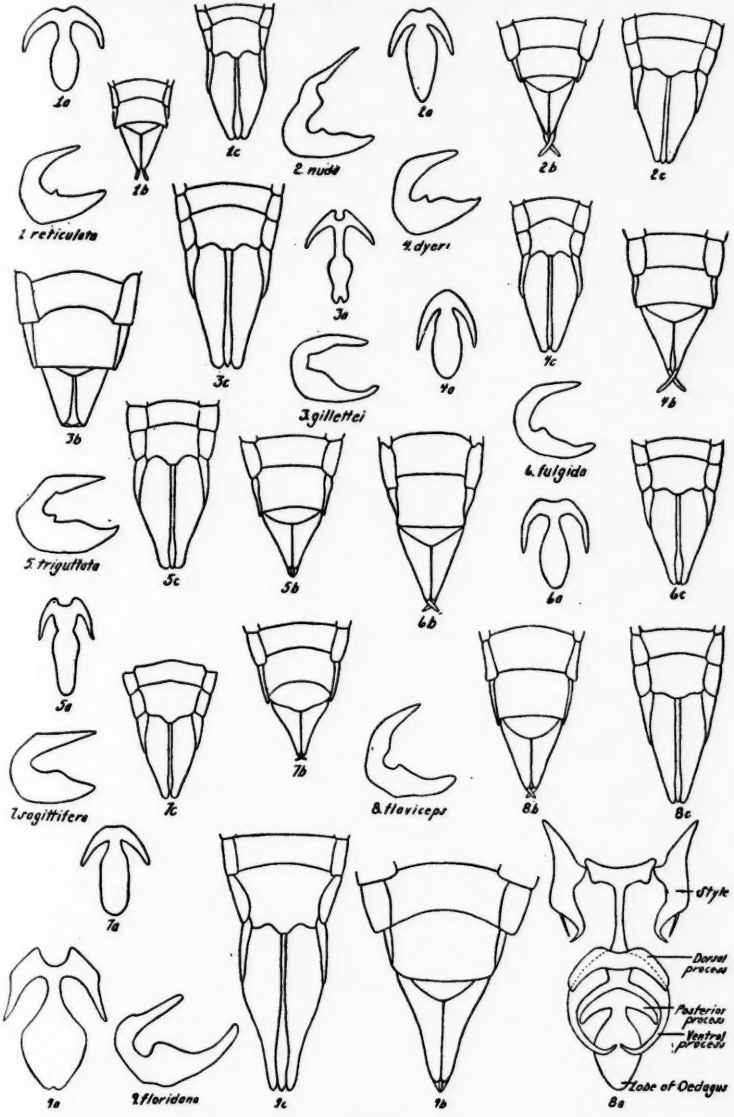


PLATE II

The Genus **Carneocephala** Jonathan O. Nottingham



THE GENUS SPANGBERGIELLA (HOMOPTERA, CICADELLIDAE) IN AMERICA NORTH OF MEXICO.

PAUL B. LAWSON, Lawrence, Kansas. *

The genus Spangbergiella Signoret has been represented in North America by two species, **S. vulnerata** (Uhler) and **S. mexicana** Baker. The latter species, described from a single female specimen taken in Mexico, has been reported from a number of states including Kansas, Tennessee, South Carolina and Florida. Recently the writer received three male specimens of a Spangbergiella from Arizona which differed strikingly from the specimens hitherto called **mexicana.** One of these was sent to the United States National Museum where Mr. Paul Oman compared it with the type of **mexicana** and reported that it was undoubtedly that species. He also compared both males and females of the species that has been called **mexicana** in the United States with the type of that species and reported that they did not agree. Accordingly all the United States records for **mexicana** should be referred to the new species described below as **S. quadripunctata.**

A very large series of specimens of **S. vulnerata** from several widely scattered states showed a very great variation in the degree of the foliation of the head of the females. A large number of specimens from Florida, however, were so uniform in having a relatively short and convex head, that they are here given varietal rank, since they can be told at a glance from specimens from all other states from New York to Texas. Also some specimens from Arkansas are unique in the very broad markings of the vertex and pronotum and are, therefore, given varietal rank.

Description of Genus

Large green or yellowish-green, somewhat flattened leafhoppers with striking red stripes on vertex and pronotum. Ocelli near eyes on margin of vertex. Elytra long, exceeding abdomen in male, nearly or quite equalling ovipositor in female, inner branch of first sector

* Contribution from the Department of Entomology, University of Kansas.

forking well cephalad on disc of corium, radius three-branched resulting in five apical cells, only one claval vein present.

Key to Species

1. Head of both sexes non-foliaceous, vertex distinctly angulate at apex and definitely angled with front 2
   Head of female strongly foliaceous; head of male non-foliaceous, vertex nearly rounded at apex and broadly rounded with front **vulnerata** (Uhler)
2. Larger species, male 5.5 mm.; female 6.5 mm, Elytra usually lacking dark spot at base of first apical cell **mexicana** Baker
   Smaller species, male 4.5 mm.; female 5.25 mm. Elytra with distinct dark spot at base of first apical cell **quadripunctata** sp. n.

Key to Varieties of S. vulnerata

1. Stripes on vertex and pronotum normal 2
   Stripes on vertex and pronotum very wide **lativittata** var. n.
2. Head strongly foliaceous, vertex flat or slightly concave on apical half **vulnerata** (Uhler)
   Head distinctly less foliaceous, vertex distinctly convex clear to apex **convexa** var. n.

Spangbergiella vulnerata (Uhler)

Figs. 5, 5a.

Glossocratus vulneratus Uhler, Bul. U. S. Geol. Geog, Surv., iii, p. 464, 1877.

A large species with head strikingly foliaceous in female; non-foliaceous and broadly rounding with front in male. Length, female 6.5 to 8 mm.; male 4.75 to 6 mm.

Head slightly narrower than pronotum. Vertex of female varying from about as long as wide to one-fourth longer than wide; disc moderately convex on basal half but flat or slightly concave and upturned on apical half; margin distinctly foliaceous but with considerable degree of variation, being sometimes narrowed cephalad of eyes and then distinctly expanded again or simply narrowing gradually from eyes to broadly angulate apex. Vertex of male about one-half wider than long, twice as long at middle as against the eye, apex rounding to slightly angulate, broadly rounding with front. Pronotum about three-fourth as long as vertex, lateral

margins long. Elytra nearly or quite equalling ovipositor and definitely exceeding pygofer in male; venation distinct.

Genitalia: Last ventral segment of female nearly one-half longer than preceding, posterior margin slightly sinuate, either truncate or very slightly produced at middle; ovipositor exceeding pygofer by about one-fourth length of latter. Male valve small; plates broad at base, concavely narrowing to long slender apices which extend to the base of the opening between the apices of the quite spiny pygofer.

Color: Green or yellowish green. Vertex with two oblique red stripes reaching over half length of vertex in female; nearly to apex in male. Pronotum with two oblique red stripes starting well mesad of end of stripes on vertex and nearly reaching posterior margin of pronotum, and with a shorter red stripe on median line. Elytral veins distinctly marked with orange yellow.

Distribution: Hitherto known from Texas, Tennessee, Florida, South Carolina, North Carolina, Virginia, New Jersey, New York, Arkansas and Kansas. The writer has before him specimens from Louisiana, Mississippi and Maryland in addition.

S. vulnerata var. lativittata var. n.
Fig. 3.

Like typical **vulnerata** except that vertex is narrower and not as foliaceous. also stripes on vertex and pronotum are distinctly wider.

Holotype, female, Polk County, Ark., Aug. 21, 1928, R. H. Beamer. **Paratypes,** one female same data; another female same data by J. G. Shaw; one female Scott County, Ark., Aug. 23, 1928, R. H. Beamer,

Types deposited in Snow Entomological Collection.

S. vulnerata var. **convexa** var. n.
Figs. 4, 4a.

Like typical **vulnerata** except that head of female is distinctly less foliaceous, vertex strongly convex clear to apex and to margins, front in side view seen to extend nearly or entirely to tip of vertex without fusing with the latter; vertex at most but slightly longer than width between eyes. Vertex of male also slightly shorter than in typical form.

Holotype, female, and male allotype, Fruitville, Fla., Aug. 11, 1930, J. Nottingham. **Paratypes,** 10 females and 18 males, from the following Florida localities: Jacksonville, Paradise Key, Yankeetown, Wildwood, Inverness, Homestead, Cocoanut Grove, Loughman, Sanford, Ocala, Plant City, Hilliard, Ft. Mead, Fruitville.

Two female and a male paratype deposited in the United States National Museum; all other types deposited in the Snow Entomological Collection.

Spangbergiella mexicana Baker.

Fig. 1.

Spangbergiella mexicana Baker, Can. Ent., xxix, p. 157, 1897.

The following is the original description of the female:

"Length 6.5 mm. Pale green, darker on vertex, pronotum and base of abdominal segments. Two oblique slender red lines on vertex, converging towards the tip, which they do not quite reach. Pronotum with two red lines extending its whole length, nearly in line with those on vertex, at its base with a medium yellowish dash. Scutel immaculate. Elytra whitish towards the tips; claval suture and all veins except apical, yellow. A black dot at end of claval suture, and one each at end of first and fourth apical veins.

"Vertex triangular, obtusely angulate anteriorly, but little longer than breadth between the eyes, about a fourth longer than pronotum. Clypeus subrectangular, broadly rounded at tip. Pronotum twice as wide as long. Ovipositor two-thirds length of rest of venter, exceeding the elytra by ½ mm. Last ventral segment a half longer than preceding, hind margin truncate.

"Described from a single female collected at Vera Cruz, Mexico, by Rev. H. Th. Heyde. This species is nearly related to **S. punctato-guttata** and **S. felix,** but is distinct from both as described above."

The male is described as follows:

Length 5.5 mm. Vertex slightly wider than long, apex acute, distinctly margined with front. Elytra distinctly exceeding pygofer.

Genitalia: Valve very small. Plates wide basally, margins concavely narrowed to acute apices which reach

opening between apices of pygofer. Pygofer spiny, exceeding plates by one-fourth the length of latter.

Color: Yellowish green. Light margin of vertex bordered above and below with narrow brown line. Red strips on vertex nearly reaching apex. Red oblique stripes of pronotum starting only slightly mesad of ends of stripes on vertex. Median stripe extending over posterior two-thirds of pronotum. Dorsum showing dark through elytra. Elytral veins marked with red, forming five distinct stripes on each elytron. Apices of elytra smoky. A small but definite dark spot at end of clavus, at end of first and of fifth apical cells and sometimes with faint spot at base of first apical cell. Underside yellow. A short brown line on base of plates parallel to margin.

Allotype, male, Tucson, Ariz., June 21, 1924, A. A. Nichol. **Parallotypes,** male Santa Rita Mts., Ariz., Sept. 26, 1925, A. A. Nichol; male, Huachuca Mts., Ariz.

First two types deposited in Snow Entomological Collection; third type deposited in the United States National Museum.

All previous references to this species from outside of Mexico should be referred to the following species.

Spangbergiella quadripunctata sp. n.

Figs. 2, 2a.

Allied to **S. mexicana** but shorter and with four black spots on each elytron. Length, female 5.25 mm.; male 4.5 mm.

Vertex about as long as width between eyes, nearly three times as long at middle as next the eye, apex acute especially in male, definitely margined with front. Pronotum as long as or slightly shorter than vertex, widened posteriorly, lateral margins long. Elytra not quite equalling ovipositor in female; exceeding pygofer in male.

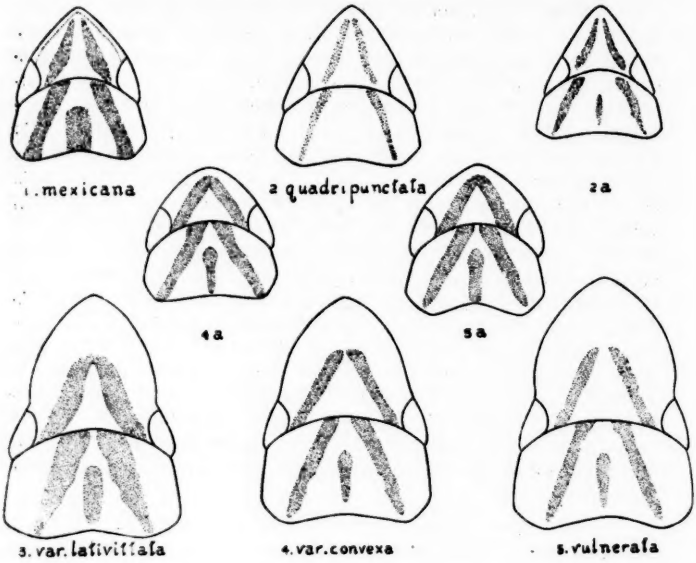
Genitalia: Female last ventral segment twice as long as preceding, posterior margin sinuate and slightly produced on either side of a very shallow median emargination; ovipositor exceeding pygofer by about one-fifth the length of latter. Male valve very small; plates broad at base, margins concave to acute apices which reach opening between apices of pygofer; spiny pygofer exceeding plates by about one-half the length of latter.

Color: Yellowish green to bright green. Vertex margined with white line which extends along lateral margins of pronotum and along base of costal margins of elytra; white line not so distinct in male. Female vertex with two oblique orange lines reaching nearly to apex; lines bright red in male. Female pronotum with two oblique orange lines starting just mesad of ends of lines on vertex; lines red on male pronotum. Male with short red median line on posterior half of pronotum which is replaced by an indefinite reddish area in female. Female elytral veins marked with four orange stripes, with small dark spots at tip of clavus and at base and apex of fifth apical cells. Male elytra with four red stripes and sometimes a short fifth one, four dark spots present as in female and with the apices smoky. Narrow brown line below margin of vertex; rest of underside green except sometimes for dark apex of beak. Male plates with short brown lines on base parallel to margin and pygofer with large dark transverse spot on each margin near base.

Holotype, male, Tigerville, S. C., Aug. 26, 1930, R. H. Beamer. **Allotype,** female, same data. **Paratypes,** 20 females and 17 males from South Carolina, District of Columbia, Kansas, Arkansas, Mississippi, Louisiana, Tennessee, Alabama, Illinois, Texas. It is also known from Virginia and Florida.

Some paratypes deposited in the United States National Museum, and in the collections of the University of Illinois and the Kansas State College. All other types deposited in the Snow Entomological Collection.

Professor Osborn's drawings of **S. mexicana** in Ohio Biological Survey, Bul. 14, p. 249, 1928, refer to this species and splendidly illustrate it.


1. mexicana
2 quadripunctata
2a
4a
5a
3. var. lativittata
4. var. convexa
5. vulnerata

SOME ERYTHRONEURA FROM THE WESTERN UNITED STATES (HOMOPTERA, CICADELLIDAE)

R. H. BEAMER, Lawrence, Kansas *

Erythroneura erosa McAtee

Erythroneoura erosa McAtee, W. L., Fla. Ento., VIII, p. 36, 1924.

As McAtee notes in his description, there is a great variation in the markings of the vertex and pronotum. This is even more in evidence in summer specimens. The outstanding color character of this species is the much deeper red color of the posterior spot on the coria. This is true even in teneral specimens.

Genitalia: Pygofer with two hooks; anterior one longer, almost straight, sharp; posterior one at tip of pygofer, slender and almost straight. Style with foot with no diagnostic characters. Oedagus long and fairly wide, evenly curved and tapered dorsally from base to tip, with pair of heavy processes arising ventrally at base and extending about half length of shaft; another pair of processes near tip, extending out and back, bifid at tip.

Allotype male, selected from a series of five males and seven females from Irvin Park, Orange Co. Cal., July 14, 1929, R. H. Beamer. There are also at hand 19 females and 10 males from Alpine, Cal., July 9, 1929. All of the above specimens were taken from the large spreading live oaks of those regions. They are deposited in the Snow Entomological Collection.

Erythroneura aucta McAtee

Erythroneura obliqua var. **aucta** McAtee, W. L., Trans. Amer. Ent. Soc., XLVI, p. 278, 1920

"Dorsal stripe bright red along edges, fading to pale red or dusky within and more or less evanescent posterior of clavi; vittae the fusion of which makes the stripe, paler on vertex, and narrowly separated there and on anterior margin of pronotum; color of dorsal surface except stripe pale greenish yellow; under-parts and legs pale yellow.

Length, 2.98.; vertex: LM 6.5, LE 3.05, WA 12, WP 21, OA 6, OP 12, OH 14; pronotum: L. 11.5, W 21; tegmen 13-64.

* Contribution from Department of Entomology, University of Kansas.

Type and paratype—sex unknown; Folsom, California, Aug. 7, 1885, (U. S. N. M.). More and better material may prove this to be a distinct species."

Genitalia: Pygofer with two hooks; one very slender and curved in, the other stout and heavy, many times wider than former, base almost a fourth as wide as pygofer. Style with foot with no diagnostic characters. Oedagus long, heavy at base, tapering to tip where it is slightly enlarged; with pair of ventral processes arising at base extending two-thirds its length and parallel with it.

Allotype, male, and 4 **parallotypes,** Folsom City, Calif., Aug. 7, 1929, R. H. Beamer, Taken from **Quercus douglasi** H. & A.

Seventy-two specimens from California, nine of which are from the type locality, when compared with the type, agreed in every respect.

All these specimens deposited in the Snow Entomological Collection.

Erythroneura ales n. sp.

General ground color semihyaline to yellowish white, marked with three distinct crossbands. Vertex of summer specimens with semblance of two spots. Pronotum with outlines of spots along anterior margin, posterior corners dark. Scutellum dark red. Tegmen with bases red almost to tip of scutellum, forming first cross-band. Second cross-band arises on costal plaque which is red to dark blue, and usually pruinose, and narrows slightly to mesal margin. Third cross-band black occupying region from just before cross-veins to tips of tegmen. Region between second and third cross-bands usually quite yellow. Cross-veins hyaline or white. Venter stramineous except valves and ovipositor of female which are reddish brown and a broad band of reddish brown across face. This latter apparently is a continuation of the first cross-band.

Genitalia: Pygofer with two hooks, one on either side, both curving in, anterior one shorter and stouter, posterior one long and slender almost parallel sided. Style with very small foot; base straight; heel small; toe short and quite sharp; one point. Oedagus quite long, narrow and straight in ventral view with a short

heavy process projecting at right angles to shaft near middle on either side, another pair of processes arising near base on ventral side, running almost parallel with shaft about one-third its length; in lateral view as broad as shaft of style, tapering rapidly to long slender point on outer third.

Holotype, male, Pintura, Utah, Aug. 11, 1929, R. H. Beamer. **Allotype,** female, 3 male and 31 female **paratypes** same data; other **paratypes** 2 males, 1 female Cove Fort, Utah, Aug. 14, 1929; 3 females Zion National Park, Utah, Aug. 13, 1929, R. H. Beamer; 1 male, and 1 female Patagonia, Arizona, July 20, 1930, E. D. Ball; 2 males and 5 females Cedar City, Utah, Aug. 13, 1929, R. H. Beamer.

This species somewhat resembles **E. canyonensis** Beamer but may be distinguished by having fewer cross bands and by the larger lateral processes on the oedagus.

Types deposited in Snow Entomological Collection.

Erythroneura balli n. sp.

General ground color, semihyaline to yellowish white, marked with red brown and black. Vertex with two round velvety black spots, one on either side of median line, slightly nearer anterior margin, and a median light brown line along with some brown color about eyes. Most of pronotum covered with brown tinged with red. Scutellum brownish tinged with red with two velvety black spots, one in each basal angle. Clavi with broad red stripe, mesal margin slightly brownish. Coria with two broad, red vittae, one on Cu, other on costal margin, fading out toward cross-veins. Cross-veins red. From cross-veins to tip more or less clouded. Abdomen, except outer segments, black. Face yellowish clouded with brown and a black spot on posterior margin. Mesoternum black.

Genitalia: Pygofer with two hooks, short and stout, both near apex; outer third covered with closely set spines. Style short with no outstanding characters. Oedagus large, almost as long as style; slightly tapering, dorsally curving shaft, bent almost at right angles to its base which in turn viewed laterally is almost parallel-sided and about two-thirds as long as shaft.

Holotype, male and **allotype** female, Huachuca Mts., Arizona, July 24, 1927, R. H. Beamer. **Paratypes**

as follows: 2 females same data; one male Santa Rita Mts., Ariz., R. H. Beamer; 5 males and 6 females, Tucson, Ariz., May 15, 1930, E. D. Ball; numerous males and females from New Mexico and Arizona, 1932, R. H. Beamer.

This species is totally unlike any known species with its four velvety black spots and bright red oblique stripes on the dorsum.

Types deposited in Snow Entomological Collection.

Erythroneura acicularis n. sp.

General ground color semihyaline to yellowish white. Vertex with inverted V-shaped yellow to red mark, enlarged near eyes to almost surround them, crossing pronotum as two almost parallel-sided, diverging vittae. Scutellum with tip yellow in summer specimens, probably red or orange in winter forms, basal angles yellow. Clavi with rather broad red vittae entire length, narrowing on outer third. Coria with usual two vittae, one near Cu, other on costa, both lighter in color than those on clavi. Beyond cross-veins more or less dusky. Venter stramineous, no dark markings. Usually one row of dark colored spines on hind tibia.

Genitalia: Pygofer with typical obliqua group hook (small non-diagonostic claw-like hook). Style with medium foot; heel large; base straight; anterior point less than right angle, projecting out, almost as wide at base as length; posterior point of much same size and shape as anterior, forming an acute angle with base of foot; toe resembling somewhat point of knitting needle. Oedagus of medium length, curved dorsally in lateral view, widest at base, tip quite evenly rounded; pair of processes inconspicously located on ventral side of shaft about one-fourth distance out from base, paralleling it and reaching about to outer third.

Holotype, male; **allotype** female, and 41 **paratypes,** Dixie, Oregon, July 8, 1931, R. H. Beamer. Other **paratypes** as follows: 27, Oliver, B. C., Canada, Aug. 6, 1931, R. H. Beamer.

This species differs from all other light abdomened obliqua-group species by having a very definite anterior point on foot and the small almost hidden processes of oedagus. The specimens were taken from wild rose.

Types deposited in Snow Entomological Collection.

Erythroneura merita n. sp.

General ground color semihyaline to white with some specimens almost solid golden yellow due to broadening of yellow oblique stripes. Vertex with two more or less triangular spots occupying most of the area, divided by a rather narrow white longitudinal stripe. Pronotum with much the same markings often run together in middle to form solid coloring. Scutellum with spot of yellow on tip and basal angles yellow, often entirely yellow. Clavi with broad longitudinal yellow vitta often covering whole surface. Coria with two vittae, one on costal margin and one following Cu to cross-veins where whole tip becomes yellow. Venter stramineous.

Genitalia: Pygofer with two spines or hooks, one in normal position about as wide at base as it is long; other at apex of pygofer longer, slightly curved dorsally, very narrow and sharp. Style with foot devoid of diagnostic characters. Oedagus long, with heavy shaft, hollowed out ventrally with processes in hollow extending about two-thirds distance to tip; tip flared somewhat and slightly bent dorsally.

Holotype, male, San Jacinto Mts., Cal., July 21, 1929, R. H. Beamer. **Allotype,** female and 125 male and female **paratypes** same data.

This species runs to **E. pinalensis** Beamer in the key to my paper entitled "Erythroneura from the Southwest", Annals Ent. Soc. Am., XII, 1929. It may be separated from this species by its light colored abdomen, broader oblique stripes and male genitalia.

The specimens were swept from live oak.

Types deposited in Snow Entomological Collection.

ERRATA FOR VOLUME V.

Page 35. Fifth line from bottom—"minuta" should read "minutum."

Page 39. Fourteenth line from bottom—insert "margin" at beginning of line.

Page 40. Tenth line from bottom—"attenatus" should be "attenuatus".

Page 86. Line 3—"tujafilimus" should read "Tujafilinus".

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